

Experimental Report

1. Purpose of Experiment

To clarify the quality of each of a conventionally used glass woven fabric having a large gas permeability and the glass woven fabric having a specified gas permeability, used in the present invention, in terms of varnish impregnation properties, and the quality of each of double-side copper-clad laminates and printed wiring boards obtained by using these glass woven fabrics in terms of properties, based on the difference in the kinds of the glass woven fabrics.

2. Experimental Methods

A. Preparation and evaluation of Prepreg

A varnish A was prepared in the same manner as in Example 1 of the present specification. Methyl ethyl ketone was added to the varnish A to obtain a varnish having a solid content of 55 % by weight. The above varnish was applied to each of the following glass woven fabrics at a rate of 5m/min, to prepare prepregs respectively.

	Conventionally used glass woven fabric Type 2319(IPC4412)	Glass woven fabric specified in the present invention
Thickness μm	86	81
Weight g/m^2	92	92
Gas permeability $\text{cm}^3/\text{cm}^2/\text{sec.}$	154	15.7

Photographs of the surfaces of these prepregs were taken and the prepregs were respectively checked for the quality of impregnation properties.

B. Preparation of double-side copper-clad laminates and evaluation thereof

Four sheets of each of the above-obtained prepregs were stacked, 12 μm thick electrolytic copper foils were placed on the upper and lower surfaces of the stacked prepregs, and pressure was applied to the resultant set from both surfaces thereof at a pressure of 25 kgf/cm^2

under a vacuum of 15 mmHg at 130°C for 30 minutes and at 190°C for 90 minutes, to obtain double-side copper-clad laminates respectively.

The copper foils on both surfaces of each of the double-side copper-clad laminates were removed by etching, and photographs of surfaces thereof and photographs of cross-sections thereof were taken. Further, printed wiring boards were respectively prepared therefrom and photographs of surfaces thereof were taken. The double-side copper-clad laminates, etc., were checked for quality based on the difference in the kinds of prepregs.

3. Experimental Results

A. Evaluation of varnish impregnation properties

As shown in the photographs of Fig.1, the prepreg using the general glass woven fabric, i.e. glass woven fabric used by Ishii et al., was poor in varnish impregnation properties and many air bubbles remained. In contrast, the prepreg using the glass woven fabric specified in the present invention was excellent in varnish impregnation properties and almost no air bubbles remained.

B. Evaluation of double-side copper-clad-laminates

Fig.2 shows cross-sectional photographs of the double-side copper-clad laminate obtained by using the general glass woven fabric and the double-side copper-clad laminate obtained by using the glass woven fabric of the present invention. In the double-side copper-clad laminate using the general glass woven fabric, voids were found between the glass woven fabrics.

Fig.3 shows surface photographs of the prepreg, the laminate and the printed wiring board using the general glass woven fabric. In the laminate and the printed wiring board, air bubbles were found.

Fig.4 shows surface photographs of the laminate using the glass woven fabric specified in the present invention. No air bubbles were found in the laminate and it was in a good state.